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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/715,675	TAOKA ET AL.	
	Examiner	Art Unit	
	DANIEL F. HAJNIK	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12 and 15-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 15-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 9, 11, 15, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betrisey et al. (US Patent 6738526).

As per claim 1, Betrisey teaches the claimed:

1. A display apparatus for displaying an image on a display device *(col 10, line 61, "Liquid crystal display device")* which includes rows of pixels *(col 8, line 39, "rows R(N), R(N+1), R(N+2)" and the rows shown in figure 6)*, each pixel composed of three sub-pixels that align in a lengthwise direction *(col 8, lines 52-54, "each one of the source image segments 622, 623, 624 is over-sampled in the direction perpendicular to the RGB striping" where over-sampling can create sub-pixels and the sub-pixels are also shown in figure 6)* of the pixel rows and emit light of three primary colors respectively *(col 13, lines 53-54, "the R, G, and B pixel sub-component luminous intensity values")*, the display apparatus comprising:

a frame memory storing color values of an image to be displayed on the display device *(in figure 24, piece 1314, a "Display Buffer" where the display buffer is a frame memory);*

a front image storage unit storing color values of sub-pixels that constitute at least one front image to be displayed on the display device *(col 12, lines 9-10, "Portions of a character within a character outline represent foreground image areas" and col 13, line 9, "foreground ... color selections" and col 13, lines 22-23, "display buffer 825")*;

a calculation unit acquiring color values of first-target-range sub-pixels that constitute a front image and are composed of a target sub-pixel and one or more adjacent sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows, and to calculate a dissimilarity level of the target sub-pixel to the one or more adjacent sub-pixels from the acquired color values *(in the "Pre Cache Filtering" embodiment Betrisey discloses such functionality, i.e. col 18, lines 58-67, "In step 1406, each scan line, e.g., the data corresponding to a row of pixels, is sampled and analyzed to determine if there will be color leakage into a neighboring glyph as a result of content of the scan line ... Padding of the scan lines of a glyph is then selectively applied by adding a set of data representing a background colored pixel (all pixel alphas=0) to the vertical edge of the glyph on the side or sides where color leakage will occur". In this instance, the analyze for color leakage is the calculating and determining of the dissimilarity level, because a great dissimilarity in color difference results in color leakage. Further, the target sub-pixels are pixels that are targeted for color correction in order to prevent color leakage);*

a superimposing unit *(figure 14, step 1416, "Process overlapping Glyph Portions to Combine Alpha Values Corresponding to Overlapping Image Portions")*, acquiring color values from the frame memory as color values of a back image *(in figure 24, where the display buffer 1314, a frame memory, feeds-back the background image data to the compositing unit 2404. In this instance, the compositing unit 2404 performs a superimposing function)*, and from color values of the front image stored in the front image storage unit and color values of an image currently displayed on the display device, color values of sub-pixels constituting a composite image of the front image and the back image *(col 27, lines 59-64, "The term compositing is used to refer to a color blending operation which involves the use of a background image to supply the background color luminous intensity values used in the blending operation. In step 2404, foreground and background colors are applied" where the foreground colors are stored as a front image and where the background colors are stored as a back image)*;

a displaying unit *(col 10, line 61, "Liquid crystal display device 754")* operable to display the composite image based on the color values thereof after the smoothing out *(col 28, lines 23-25, "The gamma corrected RGB luminous intensity values are stored in the display buffer 1314 for use in controlling the display device to display the intended character images")*.

in the smoothing out by the filtering unit, assignment of a larger weight causes a greater degradation of image *(col 19, lines 38-41, "Padding is accomplished in step 1406 by adding to the character glyph data representing each row of pixels, at least one intermediate alpha value representing a background colored pixel sub-component" where an intermediate alpha value is*

a weight and col 19, lines 4-7, "to analyzing the character glyph to detect edge points where color leakage will occur into a neighboring character glyph and selectively padding the edges". In this instance, the padding is indicative of the color leakage or greater degradation of the image. Further, the padding and intermediate alpha values acts as weights because they are indicative of areas where color leakage may occur);

when the front image storage unit stores color values of a plurality of front images and when the superimposing unit is to generate color values of another composite image using color values of another front image among the plurality of front images, the superimposing unit uses the color values stored in the frame memory after the overwriting by the filtering unit, as color values of a back image *(in figure 24, where the display buffer 1314, a frame memory, feeds-back background image data to the compositing unit 2404. In this instance, the compositing unit 2404 performs a superimposing function and uses the color values previous overwritten by the filtering unit as values of a background or back image. Also see col 17, lines 32-37, "Data from a subsequently received glyph which corresponds to the same image portion of a previously received glyph, e.g., an overlapped image portion, can be allowed to overwrite the data from the previously received glyph which corresponds to the same image portion.").*

Betrisey does not explicitly teach all the remaining claim limitations relating to the "filtering unit" because the filtering, in the Pre-Cache filtering embodiment of Betrisey is filtered before compositing. In figure 14, the filtering step 1408 occurs right before the compositing or superimposing step 1416.

Betrisey suggests the claimed:

a filtering unit operable to smooth smoothing out color values of second-target- range sub-pixels of the composite image that correspond to the first-target-range sub-pixels, by assigning weights, which are determined in accordance with the dissimilarity level, to the second-target-range sub-pixels, and to overwrite the color values stored in the frame memory with color values of the composite image after smoothing out *(in the post glyph cache filtering embodiment in figure 13 where filtering is performed in 1310 and in col 17, lines 27-37, "by writing the data, e.g., alpha values, from each received glyph into a buffer ... Data from a subsequently received glyph which corresponds to the same image portion of a previously received glyph, e.g., an overlapped image portion, can be allowed to overwrite the data from the previously received glyph which corresponds to the same image portion". In this instance, the second target-range sub pixels are the filtered sub-pixels. The weights are associated with the alpha values).*

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Betrisey to perform the filtering unit with the composite image data in order to remove any color leakage that occurs when two glyphs are overlapped in the composite image. Performing this filtering with the composite image may be easier if the composite image is particularly complex.

As explained above, Betrisey provides a suggestion in the prior art reference itself to modify the reference teachings by their example use of actually using filtering on the composite image in a different embodiment, the post-cache filtering embodiment. There is a finding of

reasonable expectation of success because the reference explicitly refers to using the post-cache filtering for reducing color leakage across pixel boundaries in col 6, lines 4-12. Furthermore, the conclusion of obviousness is further suggested by the reference where it performs post-cache filtering in figure 14 with a display buffer. Therefore, this rationale articulates a conclusion of obviousness.

As per claim 9, this claim is similar in scope to claim 1, and is rejected under the same rationale.

As per claim 11, the reasons and rationale for the rejection of claim 1 is incorporated herein. Betrisey teaches the claimed "computer-readable recording medium" *(col 10, lines 8-10, "The personal computer 720 may include ... a system memory 722").*

As per claim 15, Betrisey teaches the claimed:

15. The display apparatus of Claim 1, wherein the front image of which color values are stored in the front image storage unit has a resolution that is, in the lengthwise direction, three times a resolution of the display device, and the front image has color values of three primary colors for each sub-pixel position *(in figure 6 where the top image shows a grid of pixels and where the lower picture shows that each grid or individual pixel 640 has three sub-pixels associated with it, 632, 633, and 634. As a result, the image overall has a resolution three times that of the display device due to the presence of the sub-pixels and col 13, lines 53-54, "the R, G, and B pixel sub-component luminous intensity values")*,

the dissimilarity level calculated by the calculation unit is calculated using the three primary colors for each sub-pixel position *(col 18, lines 58-67, "In step 1406, each scan line, e.g., the data corresponding to a row of pixels, is sampled and analyzed to determine if there will be color leakage into a neighboring glyph as a result of content of the scan line" where a given scan line has three primary colors. In this instance, color leakage is a result from a large color dissimilarity)*,

the superimposing unit acquires, from the frame memory, the color values that are composed of three primary colors for each pixel position, triples the acquired color values in the lengthwise direction such that three sub-pixel positions constituting each pixel have same color value for three primary colors as color values for three primary colors of a corresponding pixel, and uses the tripled color values to generate the color values of the composite image *(in figure 24, where the display buffer 1314, a frame memory, feeds-back the background image data to the compositing unit 2404. In this instance, the compositing unit 2404 performs a superimposing function. The system deals with tripled colored values by dealing with RGB values in 2404 which occur as three primary color values Red, Green, and Blue, in figure 24 during the compositing process).*

Betrisey does not explicitly teach all the remaining claim limitations relating to the "filtering unit" because the filtering, in the Pre-Cache filtering embodiment of Betrisey is filtered before compositing.

Betrisey suggests the claimed:

the filtering unit, after the smoothing out, converts the color values having three primary colors for each sub-pixel position to color values having three primary colors for each pixel position, and overwrites the color values stored in the frame memory with the color values after the conversion *(in the post glyph cache filtering embodiment in figure 13 where filtering is performed in 1310 and in col 17, lines 27-37, "by writing the data, e.g., alpha values, from each received glyph into a buffer ... Data from a subsequently received glyph which corresponds to the same image portion of a previously received glyph, e.g., an overlapped image portion, can be allowed to overwrite the data from the previously received glyph which corresponds to the same image portion").*

It would have been obvious to one of ordinary skill in the art at the time of invention to perform the filtering after compositing as taught by the post glyph cache filtering embodiment with the teachings of the Pre-Cache filtering embodiment. The motivation of claim 1 is incorporated herein.

As per claims 17 and 19, these claims are similar in scope to claims 9 and 11, respectively, and thus are rejected under the same rationale.

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betrisey et al. (US Patent 6738526) in view of Hill et al. (US Patent 6577291).

As per claim 2, Betrisey does not teach the claimed limitations.

Hill suggests the claimed:

2. The display apparatus of Claim 1, wherein the calculation unit calculates a temporary dissimilarity level for each combination of the first-target-range sub-pixels, from color values of the first-target-range subpixels, and regards a largest temporary dissimilarity level among results of the calculation to be the dissimilarity level *(where in figure 9C, a loop is shown where different comparisons of each red green pixels for each row can be tested. In this instance, only differences greater than a given threshold are registered in the loop. Thus, if only a few dissimilarities in a scene are larger than the threshold in figure 9C, then, these dissimilarity levels are regarded among the results. Further, these dissimilarity levels are regard as some of the largest dissimilarity levels because they are greater than the threshold in figure 9C).*

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Betrisey and Hill in order to better determine whether there is a significant color different by using a threshold reference to determine large dissimilarity. Betrisey can be modified by Hill by incorporating the threshold value and the loop in figure 9C of Hill into the color leakage detection used by Betrisey. One advantage to particularly using the claimed maximum value, when given a threshold is provided, would be to quickly focus on smoothing the largest intensity dissimilarities.

As per claim 3, Betrisey teaches the claimed:

3. The display apparatus of Claim 2, wherein

the first-target-range sub-pixels and the second-target-range sub-pixels are identical with each other in number and positions in the display device *(in col 17, lines 27-37, "by writing the data, e.g., alpha values, from each received glyph into a buffer ... Data from a subsequently*

received glyph which corresponds to the same image portion of a previously received glyph, e.g., an overlapped image portion, can be allowed to overwrite the data from the previously received glyph which corresponds to the same image portion").

As per claim 4, Betrisey does not teach the claimed limitations.

Hill teaches the claimed:

4. The display apparatus of Claim 1, wherein

the filtering unit performs the smoothing out of the second-target-range sub-pixels if the dissimilarity level calculated by the calculation unit is greater than a predetermined threshold value, and does not perform the smoothing out if the calculated dissimilarity level is no greater than the predetermined threshold value *(col 19, lines 44-46, "A red/green difference intensity value is determined and compared to a threshold value", also see figure 9C, step 976).*

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize the threshold as taught by Hill with the teachings of Betrisey in order to better determine whether there is a significant color different by using a threshold reference.

Claims 5, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betrisey et al. (US Patent 6738526) in view of McCormack et al. (US Pub 2002/0097241).

As per claim 5, the reasons and rationale for the rejection of claim 1 is incorporated herein. Betrisey does not explicitly teach the remaining claim limitation relating to calculating the dissimilarity level using transparency values.

McCormack teaches the claimed:

a calculation unit operable to calculate a dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows, from (i) color values and (ii) transparency values of first-target-range sub-pixels composed of the target sub-pixel and the one or more adjacent sub-pixels stored in the front image storage unit; *([0267], "A number of methods for comparing colors are possible, of which possibly the simplest is to compute for the red, green, blue, and alpha (RGBA) components of color the absolute value of the difference between the value for one fragment and the value for the other fragment").*

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Betrisey and McCormack in order to achieve more accurate color differences between regular colors and colors using a transparency component as well. This ability to handle transparency colors with dissimilarity calculations makes the system more flexible to use with a wider variety of color pixels and formatting. Betrisey can be modified by McCormack by incorporating this color difference value into their color leakage prevention system for determining large color dissimilarities.

As per claim 10, this claim is similar in scope to claims 1 and 5, respectively, and is rejected under the same rationale.

As per claim 12, the reasons and rationale for the rejection of claims 1 and 5 are incorporated herein. Betrisey teaches the claimed "computer-readable recording medium" *(col 10, lines 8-10, "The personal computer 720 may include ... a system memory 722").*

As per claims 16, 18, and 20, these claims are all similar in scope to claim 15, and thus are rejected under the same rationale.

Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betrisey et al. (US Patent 6738526) in view of McCormack et al. (US Pub 2002/0097241) in further view of Hill et al. (US Patent 6577291).

As per claims 6-8, these claims are similar in scope to claims 2-4, respectively, and are rejected under the same rationale. It would have been obvious to one of ordinary skill in the art at the time of invention to combine Betrisey, McCormack, and Hill in order to better determine whether there is a significant color different by using a threshold reference to determine large dissimilarity. Betrisey can be modified by Hill by incorporating the threshold value and the loop in figure 9C of Hill into the color leakage detection used by Betrisey.

Response to Arguments

1. Applicant's arguments filed 1/16/2008 have been fully considered but they are not persuasive.

Applicant argues:

Thus, the present invention removes color drifts from the composite images that are displayed for the first time by the semitransparent composition, but the back image that was subject to the

smoothing out process in the previous semitransparent composition and displayed are not subject to being smoothed out again. This is especially beneficial for graphic drawing systems in which an image stored in a frame memory is displayed, the image is repeatedly subjected into the semitransparent compositions, and the frame memory is repeatedly overwritten. This is advantageous because it reduces the amount of filtering done to the back image and thus reduces image degradation. (towards bottom of page 19 in filed response, underlining added).

In view of these remarks, it appears that the prior art reference of Betrisey attempts to solve a similar problem in their pre-cache filtering embodiment. For example, Betrisey states *(col 6, lines 40-42, "The pre-glyph cache filtering embodiment allows glyphs to be filtered once, e.g., prior to storage in the glyph cache with a minimal amount of processing, e.g., summing of alpha values, then being required to patch the edges of glyphs which are combined to form larger images. Thus, the repeated filtering of the entire contents of a glyph each time the glyph is output from the glyph cache, is avoided").* The prior art deals with avoiding the repeated filtering of the entire contents of a glyph each time. Applicant's invention appears to be geared towards preventing un-necessary filtering on the back image when a front image is composited onto the back image such as in the diagram shown in figure 12 of applicant's invention. The prior art appears to be similar because it performs selective filtering on a character of glyph in which a glyphs are composited together *(in the "Pre Cache Filtering" embodiment Betrisey discloses such functionality, i.e. col 18, lines 58-67, "In step 1406, each scan line, e.g., the data corresponding to a row of pixels, is sampled and analyzed to determine if there will be color leakage into a neighboring glyph as a result of content of the scan line ... Padding of the scan*

lines of a glyph is then selectively applied"). Likewise, applicant's invention appears to also reduce image degradation by performing selective color correction or selective filtering only in portions where there is significant color dissimilarity. For example, in figure 12, intersection area 104C is the only area to be filtered twice, in contrast to, area 103a where the entire area is subjected to repeated filtering.

Applicant argues:

However, Betrisey only discloses that the gamma correction should be performed on the composite image. Betrisey does not disclose that characteristics of the front image should be taken into account before filtering the composite image to prevent image degradation. Furthermore, Betrisey also does not disclose that the color values from the frame memory is used as the back image after the overwriting by the filtering unit. (towards bottom of page 21 in filed response).

The examiner respectfully maintains that the rejections are proper because, in the pre-cache filtering embodiment in Betrisey, characteristics of the front image are taken into consideration. For example, Betrisey performs an analysis on a glyph image which can be a front image when it is composited onto another image *(col 18, lines 58-67, "In step 1406, each scan line, e.g., the data corresponding to a row of pixels, is sampled and analyzed to determine if there will be color leakage into a neighboring glyph as a result of content of the scan line ... Padding of the scan lines of a glyph is then selectively applied by adding a set of data representing a background colored pixel (all pixel alphas=0) to the vertical edge of the glyph on the side or sides where color leakage will occur").* In this instance, the padding is used to prevent image

degradation. Further, Betrisey teaches of using color values from a display buffer, a frame memory, as the back image after filtering in figure 24, where display buffer 1314 has a feedback loop which reuses color values in the compositing unit 2404.

Applicant's remaining arguments have also been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel F. Hajnik whose telephone number is (571) 272-7642. The examiner can normally be reached on Mon-Fri (8:30A-5:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka J. Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DFH

/Ulka Chauhan/
Supervisory Patent Examiner, Art Unit 2628